

and *Limacina elevata* Collins,<sup>4</sup> described from the middle Miocene of Santa Rosa, Veracruz, Mexico.

Many of the Recent species, possibly the majority, are to be found in the plankton of the Arctic.

The distribution of *Spiratella augustana*, like that of other planktonic forms, is independent of the character of the bottom except as bottom conditions affect the preservation of the dead shell. The species is contained in glauconitic sandy clays, glauconitic sands, and blocky siliceous clays. Except for a few interruptions by oyster reefs, *Spiratella augustana* is disseminated through almost the entire upper 57 feet of Tallahatta exposed along Little Stave Creek, at Lisbon Bluff and in a few nearby localities. The species seems also to lightly overstep the Tallahatta-Lisbon contact and may be recorded by a few closely related if not identical individuals in the lower 10 feet of the Lisbon formation.

DISTRIBUTION: Tallahatta formation. Little Stave Creek, 4½ miles north of Jackson, Clarke County, Alabama; U.S.G.S. station 14785 b-c, from 10 to 20 feet below the *Ostrea johnsoni* bed;

<sup>4</sup> COLLINS, ROBERT LEE, *A monograph of the American Tertiary pteropod mollusks*. Johns Hopkins Univ. Stud. Geol. no. 11: 137-234, pls. 7-14. 1934.

PALEONTOLOGY.—*Nucula austinclarki*, *n. sp.*, a concentrically sculptured *Nucula* from the Lisbon formation of Alabama.<sup>1</sup> F. STEARNS MACNEIL, U. S. Geological Survey.

Strong concentric sculpture, although not unknown, is so unusual among the Nuculidae that the question arises as to whether the few species that possess it are closely related and constitute a natural generic or subgeneric group. The ribs on different species are so dissimilar in cross section, however, that this close relationship seems doubtful. In some species the ribs are inclined steps with the high, sharp edge on the dorsal side, as in *Nucula austinclarki*, here described. In other species the high sharp edge is on the ventral side. Still other species have more symmetrical ribs with either sharp or rounded crests.

<sup>1</sup> Published by permission of the Director, U. S. Geological Survey.

U.S.G.S. station 14431, 40 feet below the top of the Tallahatta formation; between the *Ostrea johnsoni* bed and the Tallahatta-Lisbon contact, U.S.G.S. stations 14785 f-h, 17910, 17911, 17913, 17907, 17909, 17912, 17926, 17927, 17916 a-b, 17919 a: Lisbon Bluff, Lisbon Landing, Alabama River, Monroe County, Ala.; U.S.G.S. station 13430, bluish-black clay at base of section; U.S.G.S. stations 13440 and 13443, indurated layer about 8 feet below the Tallahatta-Lisbon contact; and U.S.G.S. station 13442, dense blue-gray clay with lucinoid molds directly below the fucoidal layer and not more than 5 feet below the Tallahatta-Lisbon contact; U.S.G.S. station 14799, 3.8 miles east of Silas on Bladen Springs road, Choctaw County, Ala.

Within the area, *Spiratella augustana* is most common at the stations on Little Stave Creek between the *Ostrea johnsoni* bed and a level a little below the Tallahatta-Lisbon contact. It is present, however, up to the very contact, to the blocky siliceous clays of the contact specimen itself.

Closely related though possibly not specifically identical individuals have been recovered from levels not more than 10 feet above the contact at U.S.G.S. stations 17917, 17923, and 17924.

According to Schenck,<sup>2</sup> the primary division of the Nuculidae should be on the presence or absence of denticulations of the ventral margin. All the species with concentric sculpture except one have denticulations on the ventral margins, and all these are referred to *Nucula* s.s. on the basis of shape, teeth, and ligament. Only one form, the genus *Nuculoma* of Cossmann, with concentric sculpture and no marginal denticulations is known. *Nuculoma*, which is known only from the Jurassic, appears from the figures to have concentric ribs that are gently inclined on the dorsal side and sharp on the ventral side, just the reverse of the condition in the species here described.

<sup>2</sup> SCHENCK, HUBERT G., Bull. Mus. Royal Hist. Nat. Belgique 10 (20): 18. 1934.

Three species of *Nucula* with concentric sculpture were listed by Schenck. They are: *N. haesendonckii* Nyst and Westendorp, from the Anversian (upper Miocene) of Holland, a species with *Inoceramus*-like concentric ribs, *N. compressa* Philippi, from the Chattian (upper Oligocene) of Belgium, described as having "distinct concentric undulations," and *N. duchastelii* Nyst, from the Rupelian (middle Oligocene) of Belgium, a species with strong but very irregular concentric ridges that converge and diverge across the shell.

In addition to these Oligocene and Miocene species, two other Miocene and a Recent species have been described. *Nucula* (*Nucula*) *njalindungensis* Martin, from the lower Miocene of Java and Borneo, like *N. duchastelii*, has concentric lines that freely converge and diverge. *Nucula prunicola*, Dall, from the middle Miocene of Maryland has concentric ribs that are highest and sharp at the dorsal edge and gently sloping on the ventral side. They are thus of the same type as those of the new species but are developed at the anterior end of the shell only. The chondrophore of *N. prunicola* is also much narrower than that of the species here described. *Nucula exigua* Sowerby is living from California to southern Mexico. It has concentric lirations that are more or less symmetrical and are highest along a central crest.

From the Eocene three species with concentric sculpture have been described. The new species is also of Eocene age. Two of these are from the Calcaire grossier of France, *N. capillacea* Deshayes and *N. minor* Deshayes. The third was described from the London clay of England as *N.*

*regnorum* Wrigley. All these species are small, the largest specimen of *N. regnorum* measuring 8.0 mm, and both of Deshayes's species being less than 5.0 mm in length.

A description of the new Eocene species follows:

Genus *Nucula* Lamareck, 1799

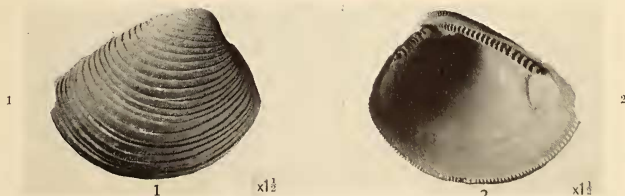
Type: *Arca nucleus* Linnaeus.

The species here described is characterized by its very unusual concentric sculpture. The shell is large for the genus, but on the basis of its shape, teeth, ligament, and marginal denticulations it appears to be a typical *Nucula*.

*Nucula austinclarki* MacNeil, n. sp.

Figs. 1, 2

Shell large and medium inflated, subovate; anterior dorsal margin gently curved; anterior extremity blunt but straighter along the dorsal margin; lunular area subrostrate; posterior margin gently curved; posterior extremity subangulate; escutcheon area truncate, with the posterior ridge curving gently in a direction opposite to the curve of the posterior margin; outer surface sculptured by strong concentric ribs that are inclined and low on the ventral side, but with a sharp, usually undercut edge on the dorsal side; most of the ribs continuous around the shell but an occasional one is partly covered or overlapped by the next younger one; ribs with faint radial lines at some points; ventral margin with well developed denticulations; teeth on the anterior side regular and nesting within each other, about 22 in number, posterior teeth less regular, not forming a uniformly chevroned series, about 10 in number; interior smooth, muscle scars impressed, pallial line strong and entire.



FIGS. 1, 2.—*Nucula austinclarki* MacNeil, n. sp., Middle Eocene, Lisbon formation, Clarke County, Ala.; holotype (U.S.N.M. no. 560585): 1, Exterior; 2, interior.

Holotype (a left valve) (U.S.N.M. no. 560585) measures: Height 22 mm, length 27 mm, diameter of single valve 7.8 mm.

Type locality and only known occurrence: A gully in the west center of sec. 10, T. 9 N., R. 4 E., Clarke County, Ala. The gully lies on the south side of the county road.

This species is closely related to *Nucula magnifica* Conrad, a species described from the Gosport sand in the upper part of the Claiborne group of Alabama, and also present in the Lisbon formation of Alabama and the equivalent portion of the McBean formation of eastern Georgia and South Carolina in the middle part of the Claiborne group. In shape, size, and dentition the two species are nearly identical. *Nucula magnifica* has a smooth surface, but occasional specimens show a slight tendency for the de-

velopment of concentric markings similar to those of *N. austinclarki* at a point or two along the posterior ridge.

*Nucula austinclarki* is from the Lisbon formation, the middle part of the Claiborne group in Alabama. Its association with *Ostrea sellaeformis* indicates that it is from the middle or upper part of the Lisbon and not from the lowest part, which carries *Ostrea lisbonensis*, the apparent forerunner of *O. sellaeformis*. From the general field relations it appears to occur in the lower part of the range of *Ostrea sellaeformis*. *Nucula magnifica* is apparently a younger species than *N. austinclarki*, being known from the upper part of the range of *Ostrea sellaeformis* and from the Gosport sand, which is stratigraphically higher than the upper limit of the range of *Ostrea sellaeformis*.

**MALACOLOGY.**—*New stenothyrid gastropods from the Philippines (Rissoidae).*<sup>1</sup>

R. TUCKER ABBOTT, U. S. National Museum. (Communicated by H. A. Rehder.)

During a survey of fresh-water mollusks in 1945 on the Island of Leyte, Republic of the Philippines, ecological and morphological notes were made on living specimens of a species of *Stenothyra* Benson, 1856, which has subsequently proved to be undescribed. An undescribed subspecies from Mindoro Island of this polytypic species was found in the U. S. National Museum. It was collected in the 1880's by J. F. Quadras and bore the manuscript name of "philippinica Moellendorff." These two gastropods are named in honor of Austin H. Clark, retiring curator of echinoderms, United States National Museum, who has given me great encouragement and help.

*Stenothyra austini*, n. sp.

Figs. 1, 3-7

**Description.**—Shell small, about 3.0 mm in length, ovoid, relatively thick-shelled, compressed ventrally, with a small circular aperture, and with unevenly developed whorls. Spire blunt and somewhat rounded. Nuclear whorls  $1\frac{1}{2}$  in number, transparent. Postnuclear whorls 3 to 4 in number, increasing irregularly in size (so that the

ventral face is flattened) until the last whorl, when they then decrease in size and form the relatively small, circular aperture. Periphery of early whorls well-rounded; last whorl moderately rounded. Suture finely and sharply impressed. Base of shell set at  $45^\circ$  to the axis of the shell, slightly convex, and thickened slightly in the area near the very small umbilicus. Aperture almost circular, with a slightly thickened continuous peristome. Behind the lip, on the exterior of the body whorl, there is a slightly thickened, smooth varix. Axial sculpture absent. Spiral sculpture consists of 10 to 15 rows of microscopic pits on the upper two-thirds of the whorl. The pits may be round, squarish or oblong. Umbilicus reduced to a minute chink. Color of shell from yellowish tan to light brown. In living specimens, the shell is translucent and the pits appear as tiny bubbles embedded in the shell. Periostracum thin, light tan. In living specimens, it covers the small pits. It is often covered with a blackish film of organic detritus. Operculum almost circular, chitinous, paucispiral, with the nucleus near the center. There are two raised, oblong lamellae of chitin reinforcing the surface of attachment. The anterior, inner edge is reinforced by a low, curved ridge (see Fig. 4). In adults, the operculum is often slightly larger than the aperture and incapable of being withdrawn into the shell.

<sup>1</sup> Published by permission of the Secretary of the Smithsonian Institution. Received October 6, 1950.